

From: [Beauchamp, Richard \(DSHS\)](#)
To: [Cecilia Dykes](#)
Cc: [Stephen Tzhone/R6/USEPA/US@EPA](#); [Villanacci, John \(DSHS\)](#); [Prosperie, Susan \(DSHS\)](#); [Beauchamp, Richard \(DSHS\)](#); [Walker, Tina \(DSHS\)](#); [Rivera, David \(DSHS\)](#)
Subject: RE: SJWP Health Assessment - Technical question
Date: 07/19/2011 05:43 PM

Dear Ms. Dykes,

It is true that parts of Highlands are in the 10-year flood plain. However, during most flooding events, massive amounts of water are coming from the entire catchment area of the San Jacinto River. These waters are trying their best to get into the river and from there into the gulf, the area of lowest elevation. When too much water has fallen in Highlands and farther up-stream, the river channel is not big enough to carry the volume, and water "backs up" causing the area to flood. The water is still gradually working its way down-stream (and not really "backing up" or flowing in reverse), it just can't drain out of the area fast enough to keep the water from building up in the flood plain areas. The only times that water may move somewhat in a retrograde direction is during unusually high tide events and, to a far greater extent, during storm surges from hurricanes such as Hurricane Ike in 2008. During these events, massive amounts of salt water from the gulf are "piled up" on the east side of the hurricane as a result of the counter-clockwise rotation of the hurricane-force winds. When the gulf waters are piled up in front of a river channel, huge volumes of gulf water flow retrograde up the river causing severe flooding up-stream.

I personally made visits to the site both before Hurricane Ike and after the hurricane, and I could not see major changes to the site terrain though the entire area had been under 10-15 feet of water during the storm. Clearly some of the contaminated sediments from the site may have become suspended in the storm-surge waters. However, it is also clear that there would be massive dilution of these suspended and contaminated sediments into millions (billions?) of gallons of salt water, the vast majority of which made its way back into the gulf as the storm-surge subsided. The minor amounts of residual, highly-diluted, contaminated sediments still would have to percolate down through 350 feet of sand and clay which would act as a filter, effectively removing any significant trace of sediment from the water that eventually winds up in the aquifer where it could be accessed by someone's well. (Remember, dioxins bind tightly to sediments and therefore do not move well horizontally or vertically through a sand and clay aquifer). Consequently, it is just not plausible to imagine significant amounts of sediments being sucked out of the surface impoundments at the site and being transported a mile north and across the river to Highlands where they could get down into someone's well at concentrations high enough to be a health hazard. So, in answer to your question, no, I do not think well water contamination (with dioxins) would be a problem for homeowners in Highlands. Fecal coliform (and other fecal micro-organism) contamination of wells from nearby flooded sewers, septic systems, and animal wastes are a far more likely health risk during such floods.

Part of the data I looked at when I was doing the SJRWP Health Assessment included over 150 water samples taken from the San Jacinto River-Houston Ship Channel-Upper Galveston Bay (SJR-HSC-UGB) waterway system in 2002-2004 by the University of Houston under the Dioxin TMDL Project. The highest concentration I could find among the samples was 3.09 pg/L (1 picogram or pg is one millionth of one millionth of a gram) and the risk estimate, assuming that a person would drink 2 liters of the water per day for a 70 year lifetime, was 6.6×10^{-6} . Since the highest concentration was a factor of 10 below the drinking water standard, the SJR-HSC-UGB is not a public drinking water supply, and no one is ever going to drink these waters because of salinity anyway, I did not bother to do any detailed analysis or report these numbers in the Health Assessment. Interestingly, that highest sample was collected from the San Jacinto River where it crosses under the IH-10 Bridge and is therefore likely to be close to a worst-case scenario. For comparison purposes, an average person in the U.S. takes in approximately 116 pg of dioxins per day from various food sources (primarily, milk, cheese, beef, pork, chicken, and fish). If that person also routinely drank 2 liters of water from the San Jacinto River where it crosses under the IH-10 Bridge, they would get an additional 6 pg of dioxins per day (not a significant addition to their normal daily intake). Any way I look at it, I just don't anticipate a problem with dioxins in groundwater in Highlands or Channelview.

I hope this information puts your mind at ease with respect concerns over private well or groundwater dioxin contamination in Highlands from the SJRWP site.

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From: Cecilia Dykes [mailto:cecilia@airalliancehouston.org]
Sent: Tuesday, July 19, 2011 7:17 AM
To: Beauchamp, Richard (DSHS)
Subject: Re: SJWP Health Assessment - Technical question

Dear Dr. Beauchamp,

Thank you for addressing my concerns. I do appreciate your time in explaining the hydrology involved which helps to understand the exposure pathways. May I bother you with another question?

I noticed that in the health assessment the issue of the San Jacinto River flooding its banks was not mentioned. I believe that Highlands is in a 10 year flood plain. Since flood waters can contaminate wells, would this not be a problem for homeowners?

Cecilia Dykes

On Mon, Jul 18, 2011 at 6:01 PM, Beauchamp, Richard (DSHS)
<Richard.Beauchamp@dshs.state.tx.us> wrote:

Ms. Dykes,

There are a number of reasons why groundwater wells in Highlands should not be expected to be affected by contaminants from the San Jacinto River Waste Pits (SJRWP) superfund site. The dioxin wastes from the pits bind tightly to sediments, clays, and sands, so they are not free to move significantly with groundwater flow. Contaminants would have to pass down through over 300 ft of overlying clays and alluvial deposits and a mile north to get down to the level where water wells in the Highlands area are screened (generally around 330-350 ft.). Compacted clays under areas with significant subsidence (as in the vicinity of the SJRWP site) form nearly an impermeable barrier to the downward passage of water. Groundwater flow through the Chicot and Evangeline aquifers is relatively slow – in the range of a few feet per year. Ground water in these aquifers generally flows toward the gulf and consequently away from Highlands which is north of and on the other side of the river from the waste pits. In the

vicinity of rivers (such as the San Jacinto), the shallow groundwater from both sides of the river tends to flow into the river and would not be expected to cross under the river, carrying contaminants to the other side (even if the contaminants were dissolved and could move freely with the groundwater).

For the above reasons, groundwater from private wells in Highlands was not considered by DSHS and ATSDR to be a plausible exposure pathway for site contaminants from the SJRWP site. In the absence of a plausible exposure pathway and with no sampling data to indicate the presence of dioxins in the groundwater in Highlands, it is not possible to generate risk estimates. However, since the EPA is very thorough in their evaluations of superfund sites, I would not be surprised if they tested some groundwater samples from Highlands and Channelview.

If you have any further questions feel free to contact me at the numbers below.

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From: Stephen Tzhone [mailto:Tzhone.Stephen@epamail.epa.gov]
Sent: Friday, July 15, 2011 1:30 PM
To: Beauchamp, Richard (DSHS)
Cc: Gary Miller; Carlos Sanchez; Donn Walters; jlyke@cdc.gov
Subject: Fw: SJWP Health Assessment - Technical question

Hi Dr. Beauchamp,

I'm forwarding questions on the SJRWP public health assessment (see below). Please respond or advise on TDSHS path forward, thanks.

Thanks,

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From: Cecilia Dykes <cecilia@airalliancehouston.org>
To: Stephen Tzhone/R6/USEPA/US@EPA
Date: 07/15/2011 09:46 AM
Subject: SJWP Health Assessment - Technical question

Mr. Tzhone,

Sorry to bother you again about the San Jacinto River project, but I have a question you might be able to answer or maybe you could steer me to someone who could explain.

My questions is why water wells were not considered in the health risk factor. What was considered the "immediate vicinity of the site?" I have learned the Highland neighborhood relies on household wells for their drinking water.

"Because of the nature of the contaminants, their low volatility, their high affinity for soil particles, and the high vegetation coverage on the site – leading to low likelihood of wind-blown dust – the airborne route was not considered a significant pathway of exposure for this PHA. Additionally, the groundwater pathway was not considered because groundwater in the area is brackish and non-potable, and there are no groundwater wells in the immediate vicinity of the site. Surface water samples were not collected and reported in the hazard ranking system (HRS) documentation, and the probability of regular ingestion of surface water from the SJR, HSC, or UGB is low because these waters are brackish and non-potable; therefore, surface water was not considered to be a significant pathway of exposure at this site."

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